

# Liquid Nitrogen Dry Shippers Preparation and Shipping Requirements



## Overview

Dry shippers are large Dewar (vacuum) flasks that contain a porous material. They are designed for the safe shipment of specimens at liquid nitrogen temperatures without the risk of spilling liquid nitrogen (LN2). When prepared correctly, a dry shipper does not contain any free LN2.

This Update outlines the steps to ensure the appropriate preparation of dry shippers and corresponding paperwork. While LN2 is classified by the United States Department of Transportation (USDOT) and as a Dangerous Good by the Hazardous Material and International Air Transport Association (IATA), a properly prepared “dry shipper” is not. This allows for more flexibility and is less costly when shipping non-hazardous frozen materials.

Dry shippers are **only exempt if** they:

- Do not allow the build-up of pressure within the container.
- Do not permit the release of any refrigerated LN2 regardless of the dry shipper’s orientation.
- Are identified as “*Not restricted, as per Special Provision A152*” on the accompanying air waybill.

Dry shippers typically contain **non-regulated** or **exempt products**. Special additional packaging may apply to dry shippers containing Category A or B biological materials. Cryoport ([www.cryoport.com](http://www.cryoport.com)) and FedEx ([www.fedex.com](http://www.fedex.com)) have collaborated to rent pre-cooled, returnable dry shippers. An account for this service is set up through FedEx.

## Applicability

**This update applies to all WCM faculty, staff, and students working with liquid nitrogen (LN2) dry shippers.** It includes information from the International Air Transport Association (IATA) Dangerous Goods Regulations. Improperly prepared dry shippers present a risk of liquid nitrogen leakage and are subject to regulation by the United States Department of Transportation (USDOT) should spillage occur. **Violations of USDOT shipping regulations may result in civil and/or criminal penalties.** This update also provides general hazard warning and safety precaution information to users of LN2. Laboratory personnel who work with or in areas where LN2 is used must be familiar with these guidelines.

## Responsibilities

**Laboratory Personnel:** All personnel preparing LN2 dry shippers must have completed the [EHS Biological Material and Dry Ice Shipments](#) training. All laboratories that store or use LN2 must comply with the handling and storage requirements listed in the [EHS Liquid Nitrogen Handling and Use](#) update. Laboratory personnel must also obtain a [FDNY G-97 Supervision of Commercial Cryogenic Systems and for Storage and Handling of Cryogenic Liquids Certificate of Fitness \(CoF\)](#) where required.

**Environmental Health and Safety (EHS)** provides training and certification in Biological Material and Dry Ice Shipments. EHS also provides guidance and training on the safe handling and use of LN2 upon request, and assistance to staff applying for the G97 CoF.

## Procedure

### FILLING THE DRY SHIPPER

**Always Follow the Manufacturer’s Instructions for Filling**

1. **Wear a face shield and appropriate insulated gloves made for handling liquid nitrogen.**
2. **Always work in well-ventilated areas, as high concentrations of nitrogen can cause suffocation.**
3. **Always add the liquid nitrogen *slowly*.** A significant amount of nitrogen gas will be generated as the cold liquid contacts the shipper’s warm surfaces.
4. When the liquid reaches the neck of the dry shipper, stop filling. Replace the cap and set the dry shipper aside for the period specified by the manufacturer to allow the liquid nitrogen to saturate the absorbent.
5. Repeat steps until the liquid level no longer drops on standing. This may require as many as 15 repetitions over 24 hours.



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PREPARING FOR SHIPPING

Remove All Free Liquid Nitrogen from the Dry Shipper before Transport

1. Wear insulated gloves, a thermal apron, and a face shield when emptying the dry shipper.
2. Empty the dry shipper by pouring the excess liquid nitrogen back into a large liquid nitrogen Dewar flask.
3. If this cannot be done, pour the liquid nitrogen out of the shipper in an appropriate area.
  - Do NOT pour liquid nitrogen down the sink as it could crack the pipes or onto the floor as it could splash onto your shoes or legs and cause severe burns.
  - Ensure that any area where liquid nitrogen is poured away is well ventilated.
4. Hold the dry shipper upside down until the liquid stops flowing.
5. Stand the dry shipper upright for the period specified by the manufacturer.
6. Repeat steps 2–5 as many times as necessary to remove any remaining liquid nitrogen.
7. Put specimens into the dry shipper and replace the cap.
8. Place the dry shipper into the protective case, if applicable.

DOCUMENTATION FOR SHIPPING

Include Special Provision number A152 on the airway bill.

When an air waybill is issued, the following statement must be added verbatim “Not restricted, as per Special Provision A152”. See an example on how to complete the airway bill below.

The image shows a FedEx USA Airbill form with several sections. Red circles A through E are placed around the form with arrows pointing to specific fields. A dashed blue box highlights the 'Does this shipment contain dangerous goods?' section at the bottom.

- A** - Points to the 'From' section (Sender's Name, Address, City, State, ZIP).
- B** - Points to the 'Special Provision' field (0200) in the top right corner.
- C** - Points to the 'Packaging' section (5) where 'Other' is selected.
- D** - Points to the 'Does this shipment contain dangerous goods?' section.
- E** - Points to the 'Total Packages' and 'Total Weight' fields.

The 'Does this shipment contain dangerous goods?' section contains the following text:
   
Does this shipment contain dangerous goods? **One box must be checked.**
  
 No  Yes As per attached Shipper's Declaration  Yes Shipper's Declaration not required
   
 Dry Ice Dry Ice, 9, UN 1845 \_\_\_\_\_ x \_\_\_\_\_ kg
   
 Cargo Aircraft Only
   
Dangerous Goods (including Dry Ice) cannot be shipped in FedEx packaging.

- A – Ship to/from info
- B – “Not restricted, as per Special Provision A152”
- C – “Other” Packaging
- D – “No” (dangerous goods)”
- E – Number and Weight of Packages